



# Is Graft Use Safe in Emergency Inguinal Hernia Repair?

## Greft Kullanımı Strangüle Kasık Fıtığı Onarımlarında Güvenli Midir?

Graft Use in Emergency Inguinal Hernia

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### Özet

**Amaç:** Bu klinik çalışmanın amacı, acil ameliyat endikasyonu olan kasık fıtıklarında mesh kullanımının sonuçlarını araştırmaktır. **Gereç ve Yöntem:** Bu çalışmada inkarsere kasık fıtığı nedeni ile ameliyat edilen hastalar (n=246) yer aldı. Hastalar ameliyat tipine göre; Lichtenstein onarımı (grup 1), primer onarım (grup 2) olmak üzere 2 gruba ayrıldılar. **Bulgular:** Ameliyat ve hastanede kalış süresi, postoperatif mortalite ve morbidite açısından gruplar arası anlamlı farklılık izlenmedi ( $p>0,05$ ). Barsak rezeksiyonu daha çok kadınlarda ve yaşlılarda yapıldı. Buna ek olarak bu hastalar daha uzun süre hastanede kaldılar. Ayrıca komplikasyon oranı bu hastalarda daha yüksekti. **Tartışma:** Strangüle inguinal fıtıklarda poliprolen mesh güvenli ve etkin bir biçimde kullanılabilir.

### Anahtar Kelimeler

Fıtık; Mesh

### Abstract

**Aim:** The aim of this clinical study is to investigate the consequences of mesh use in cases of inguinal hernia with an indication of emergency operation. **Material and Method:** Patients who were operated on for incarcerated inguinal hernia (n=246) were included in the study. The patients were divided into the following groups according to the type of operation: Lichtenstein repair (Group 1) and primary repair (Group 2). **Results:** There were no significant differences in duration of operation and hospitalization, post-operative mortality and post-operative morbidity between the two groups ( $p>0.05$ ). The incidence of intestinal resection was higher in women and elderly patients. Furthermore, these patients needed longer hospitalization time. In addition, the rate of complication was higher in these patients. **Discussion:** Polypropylene mesh can be safely and effectively used in cases of strangulated inguinal hernia.

### Keywords

Hernia; Mesh

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## Introduction

The use of polypropylene mesh in hernia repair is a preferred method in elective hernias as well as strangulated hernias that require emergency operation, as it is associated with lower post-operative complication rates [1-3]. In this clinical study, we aimed to investigate the effect of graft use on morbidity and mortality in adult patients who underwent emergency operation for incarcerated inguinal hernia.

## Material and Method

Patients operated on for incarcerated inguinal hernia between January 2007 and January 2012 were included in the study. Local ethics committee approval was obtained for this prospective randomized clinical trials. Patient data were recorded on a form prepared in advance. Irreduction of external hernias was defined as “incarceration”, and signs of intraoperative ischemia and necrosis in addition to irreduced hernia were defined as “strangulation”. After this classification, 246 patients were divided into two groups with respect to the method used for hernia: Group 1 - Lichtenstein repair and Group 2 - Primary repair (Bassini). American Society of Anesthesiologists (ASA) scoring was used to assess the risk of pre-operative anesthesia. During the operation, the hernia sac was freed, then saline solution (9% NaCl) was given, and the intestines were replaced in the abdomen after the blood flow returned to normal. Resection was performed in cases if intestinal viability was doubted or not present. A midline incision was performed when it was not possible to perform resection from the existing site. Antibiotic treatment was planned according to the risk of infection associated with the operation and in line with the Institutional Infection Committee's guidelines. The choice of repair method was determined in a prospective randomized manner by drawing. Ethical approval was obtained from the institutional ethics commission. Informed consent forms were obtained from each patient. The route of anesthesia was either general or spinal, and this decision was made by considering the location of the hernia and the suggestion of the anesthetist. Two hundred forty-six patients were evaluated with respect to age, location of hernia, surgical finding, type of operation, morbidity and mortality. The postoperative complications were examined in two different groups, being either local or general. Pulmonary, cardiac and renal post-operative complications were collectively referred to as “systemic complications”. Local complications were analyzed as surgical site infection, hematoma, wound disintegration, and seroma. Patients who were followed-up for at least one month (including polyclinic controls) were included in the post-operative evaluation of surgical site infection.

## Statistics

All data were recorded on “SPSS 17.0 for Windows” (SPSS Inc. Chicago IL.) statistical analysis software. The factors affecting morbidity were evaluated using logistic regression analysis. For these variables, univariate analysis was performed using chi-square and Student's t-tests. Multivariate analysis was additionally performed for those variables that had statistical significance. P values < 0.05 were considered statistically significant.

Table 1. A comparison of patients' surgical technique p<0.005 were considered statistically significant

	Group 1, Hernia repair with graft (n = 125)	Group 2, Primary hernia repair (n = 121)	P*
Age	47.61 ± 13.68	48.41 ± 12.98	0.405
Gender F/M	23/102	19/92	0,270
ASA score I-II	40	49	0,563
ASA score III-IV	20	9	0,563
Operation time (minutes)	52.81 ± 8.98	49.12 ± 11.82	0.405
Length of hospital stay (days)	1,88 ± 0,60	1,64 ± 0,41	0,82
Time to return to work (days)	15,5 ± 0,88	14,22 ± 0,42	0,650
Follow-up time (months)	44,36 ± 1,88	40,28 ± 1,07	0,32

## Results

Two hundred forty-six patients were included in the study. Forty-one patients were female and 205 patients were male. Strangulation was found in 116 patients (44%). bowel resection was performed on 64 of these patients. 13 of the patients who underwent resection (41%) were female. 35 (67%) patients in the repair of bassini and 17 (33%) of the patients with graft repair was preferred, for strangulated hernia. Serous fluid collection and discharge at wound site was observed in 8 out of 125 patients (6.4%) in Group 1, and 7 out of 121 patients (5.7%) in Group 2. The comparison of groups with respect to post-operative complication and intraoperative intestinal resection is summarized in Table 2. In these comparisons, there were no significant differences between the groups (p>0.05). All surgical site infections were cured by wound dressing and antibiotic treatment. With respect to intestinal resection, the mean age of patients who had intestinal resection was higher, and the probability of resection was higher in female patients and in patients who had high risk for anesthesia (p<0.05) In addition, the duration of operation, hospitalization time and the probability to develop post-operative complication and recurrence was significantly higher in patients who required resection (Table 3).

Table 2 Comparison of complications of surgical technique followed by p<0.005 were considered statistically significant

Systemic Complications	Group 1, Hernia repair with graft (n = 125)	Group 2, Primary hernia repair (n = 121)	P*
Pneumonia	4	6	0,278
Heart Failure	4	5	
Myocardial Ischemia	3	4	
Anastomotic Leakage	0	0	
Local Complications			
Testicular Atrophy	2	3	0,651
Scrotal Edema	8	9	
Wound Infection	9	8	
Urinary Retention	13	16	
Hematoma	6	8	

## Discussion

Inguinal hernias are frequently encountered by the surgeons. It is generally suggested to perform these operations under elective conditions to avoid hernia-related, complicated, and

Table 3. Comparison of patients with and without bowel resection  $p < 0.005$  was considered statistically significant.

	Bowel Resection (n=64)	Bowel Resection without (n=182)	P*
Age	58,44 ± 1,33	36,88 ± 0,38	<0,001
Gender F/M	24/40	14/168	<0,001
ASA score I-II	12	135	<0,001
ASA score III-IV	20	7	
Operation time (minutes)	58,22 ± 2,00	44,32 ± 1,36	<0,001
Length of Hospital Stay (days)	4,22 ± 0,60	1,78 ± 0,41	<0,001
Postoperative Complications	22/32	56/182	<0,001

emergency admissions [4]. The primary repair of inguinal hernias is generally performed using the technique described by Lichtenstein and many studies that used this technique have been published [5]. While the use of mesh in emergency conditions (strangulation) is questioned, the number of reports stating the efficacy and reliability of mesh use in these conditions are increasing [1,2,6]. In addition to their use in elective hernias, polypropylene mesh can also be used in cases of strangulated hernia with acceptable post-operative complication rates [1-3]. Beltran et al. used mesh to repair elective and emergency strangulated hernia, and did not detect a significant difference in postoperative complications between the groups [7]. Bessa et al. used polypropylene mesh to repair elective and strangulated hernia and did not detect an increase in the rate of post-operative complications, stating that the mesh can be safely used in these conditions [8]. The definitive diagnosis of incarceration can only be made during surgical exploration, because there is no significant correlation between intestinal viability and clinical symptoms [9]. The most common sites of incarceration are small intestine, omentum and colon, respectively. When adult patients and elderly patients who have the same irreducibility duration are compared, the incidence of necrotic intestinal resection is higher in elderly patients; this points to the fact that intestines compact with age and become less durable to ischemia and incarceration [10,11]. Kurt and Alvarez determined that intestinal resection did not affect mortality, but increased the rate of local complications (e.g. wound infection) and hospitalization time [9,12]. The incidence of mortality and morbidity in cases of incarcerated abdominal wall hernia range between 1.4-13.4% and 19-30%, respectively. Mortality and morbidity are associated with strangulation and intestinal resection [12,13]. During inguinal hernia repair, there is no difference with respect to infection development between using conventional sutures and mesh [14,15]. According to Gilbert and Felton, the infection rate was 0.8% when mesh is used, and 1% when sutures are used [15]. When synthetic patches are used for repair, wound site infections can be caused by any pathogenic microorganism, including fungi; however, the most common cause is *Staphylococcus aureus* [16]. In our case, the most frequently encountered cause was *Staphylococcus epidermidis*. If a patient presents symptoms including idiopathic fever, signs of inflammation at the mesh site and abdominal wall, extracutaneous fistules, or abdominal abscess, it is reasonable to suspect of a graft-associated infection. In this case, imaging techniques such as ultrasonography, tomography, or magnetic resonance imaging can be used. These techniques indicate

the inflammation area in the subcutaneous tissue around the graft [17]. We did not observe any graft-associated infection in any group. Compared to men, incarcerated hernias in women were associated with a higher incidence of strangulation and intestinal necrosis, while there was no significant correlation between gender-mortality and gender-morbidity. In cases with incarceration, a high ASA score, which may be associated with comorbidities, was correlated with strangulation, longer hospitalization time, and high morbidity [13,19]. In our case, the correlation between incarcerated hernias that underwent emergency operation and advanced age, gender (female), high ASA score, long operation time, long hospitalization time, and systemic post-operative complications were significantly higher ( $p < 0.001$ ). In cases of incarcerated abdominal wall hernia, development of intestinal necrosis prolonged the hospitalization time and increased the incidence of complications [20]. We did not find any significant correlation between the intestinal resection and surgical site infection. For this patient group, the mortality rate ranges between 2.6-9% in the literature [20]. We did not observe any mortality in patients who underwent emergency operation due to incarceration.

### Conclusion

Polypropylene mesh can be safely used in strangulated hernias that require emergency operation as its use is associated with low rates of postoperative complications.

### Competing interests

The authors declare that they have no competing interests.

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